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Aziah Tesfay

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US005840299A

United States Patent [19]**Bendig et al.**[11] **Patent Number:** **5,840,299**[45] **Date of Patent:** **Nov. 24, 1998**[54] **HUMANIZED ANTIBODIES AGAINST
LEUKOCYTE ADHESION MOLECULE
VLA-4**[75] **Inventors:** **Mary M. Bendig**, London; **Olivier J. Léger**, Hertfordshire; **José Saldanha**, Enfield Middlesex; **S. Tarran Jones**, Radlett, all of United Kingdom; **Ted A. Yednock**, Fairfax, Calif.[73] **Assignee:** **Athena Neurosciences, Inc.**, South San Francisco, Calif.[21] **Appl. No.:** **561,521**[22] **Filed:** **Nov. 21, 1995****Related U.S. Application Data**[63] ~~Continuation-in-part of Ser. No. 386,269, which is a continuation-in-part of PCT/US95/01219, Jan. 25, 1995, abandoned.~~[51] **Int. Cl.⁶** **A61K 39/395**; **C07K 16/28**;
C12P 21/08; **C12N 15/13**[52] **U.S. Cl.** **424/133.1**; **424/130.1**;
424/141.1; **424/143.1**; **424/144.1**; **424/153.1**;
424/154.1; **424/173.1**; **435/7.1**; **435/7.2**;
435/7.21; **435/7.24**; **435/69.6**; **435/172.3**;
435/251.3; **435/320.1**; **530/387.3**; **530/388.73**;
530/388.75; **530/388.22**; **536/23.53**[58] **Field of Search** **424/130.1**, **133.1**,
424/141.1, **143.1**, **144.1**, **153.1**, **154.1**, **173.1**;
435/69.6, **172.3**, **252.3**, **320.1**, **7.1**, **7.2**,
7.21, **7.24**; **536/23.4**, **23.5**, **23.53**; **530/387.1**,
387.3, **388.2**, **388.22**, **388.7**, **388.73**, **388.75**[56] **References Cited****U.S. PATENT DOCUMENTS**5,260,210 11/1993 Rubin et al. 435/240.23
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Kahan *Curr Opin Immunology* 4: 553-560 (1992).Natanson et al. *Ann Intern Med.* 120: 771-783 (1994).Dalakas *Ann. Neurol.* 37(51): 52-513 (1995).Paul (ed) *Fundamental Immunology* Raven Press NY 1993 p. 242 only.*Primary Examiner*—Lila Feisee*Assistant Examiner*—Phillip Gambel*Attorney, Agent, or Firm*—Townsend & Townsend & Crew LLP

[57]

ABSTRACT

The invention provides humanized immunoglobulins that specifically bind to the VLA-4 ligand, and methods of treatment using the same. The methods are particularly useful for treatment of multiple sclerosis.

29 Claims, 16 Drawing Sheets